Claims:

1.

Apparatus for compression molded plastic articles, which includes:

a plurality of molds mounted for endless motion around a first axis, each of said molds including a first section and a second section, at least one of which is movable with respect to the other in a direction parallel to said first axis to form a mold cavity, and

a pellet cutter and transfer apparatus for forming individual mold charge pellets from a source of plastic material and delivering the individual mold charge pellets to said mold cavities, said apparatus including:

a hub rotational around a second axis parallel to said first axis,

at least one arm extending generally radially from said hub to rotate with said hub around said second axis, and

a cam system extending at least partially around said second axis and operatively coupled to said arm for moving said arm in at least one predetermined direction with respect to said second axis as said hub and said arm rotate around said second axis.

2.

The apparatus set forth in claim 1 wherein said cam system includes a cam arrangement for moving said arm radially inwardly and outwardly with respect to said second axis as a function of rotation around said second axis.

3.

The apparatus set forth in claim 1 wherein said cam system includes a cam arrangement for moving said arm angularly with respect to said hub as a function of rotation of said hub and said arm around said second axis.

4.

The apparatus set forth in claim 1 wherein said cam system includes a cam arrangement for moving said arm axially parallel to said second axis as a function of rotation around said second axis.

5.

The apparatus set forth in claim 1 wherein said cam system includes a cam arrangement for moving said arm radially inwardly and outwardly with respect to said second axis as a function of rotation around said second axis, and for moving said arm angularly with respect to said hub as a function of rotation of said hub and said arm around said second axis.

6.

The apparatus set forth in claim 1 wherein said cam system includes a cam arrangement for moving said arm radially inwardly and outwardly with respect to said second axis as a function of rotation around said second axis and for moving said arm axially parallel to said second axis as a function of rotation around said second axis.

7.

The apparatus set forth in claim 1 wherein said cam system includes a cam arrangement for moving said arm angularly with respect to said hub as a function of rotation of said hub and said arm around said second axis and for moving said arm axially parallel to said second axis as a function of rotation around said second axis.

8.

The apparatus set forth in claim 1 wherein said cam system includes a cam arrangement for moving said arm radially, axially and angularly with respect to said second axis as a function of rotation around said second axis.

9.

The apparatus set forth in claim 1 wherein said arm includes a pivot shaft carried by the hub and defining a pivot axis about which the arm is pivoted, said pivot axis being parallel to said second axis.

10.

The apparatus set forth in claim 9 wherein the arm includes a base plate that is operably connected to the pivot shaft.

11.

The apparatus set forth in claim 10 wherein the arm includes a slide plate carried by the base plate for movement along the base plate generally radially with respect to said second axis, said slide plate being responsive to the contour of a cam surface of the cam system to drive the slide plate relative to the base plate.

12.

The apparatus set forth in claim 10 wherein the arm includes a plate carried by the base plate for movement along the base plate generally axially with respect to said second axis, said plate being responsive to the contour of a cam surface of the cam system to control movement of the plate relative to the base plate.

13.

The apparatus set forth in claim 10 wherein the arm includes an intermediate plate carried by the base plate for radial movement relative to the base plate and a third plate carried by the intermediate plate for movement with the intermediate plate relative to the base plate, and said third plate being movable relative to the intermediate plate in a direction parallel to the pivot axis.

14.

The apparatus set forth in claim 1 which also includes a pair of tooling assemblies carried by the arm and spaced from each other with each tooling assembly adapted to carry a separate mold charge pellet, and wherein each mold includes at least a pair of radially aligned mold cavities, said arm being moved relative to said hub so that a point midway between the tooling assemblies moves in a plane during a portion of the hub rotation to facilitate aligning the mold charge pellets carried by the tooling assemblies.

15.

The apparatus set forth in claim 14 wherein said plane is perpendicular to a plane that includes the first axis and second axis.

16.

The apparatus set forth in claim 15 wherein during the portion of the hub rotation wherein said point midway between the tooling assemblies moves in said plane said point intersects said plane that includes the first axis and the second axis.

17.

The apparatus set forth in claim 14 wherein during said portion of hub rotation the arm is moved angularly and radially relative to the hub.

18.

The apparatus set forth in claim 17 wherein the arm is also moved axially relative to the hub to facilitate releasing the mold charge pellets from the tooling assemblies.

19.

The apparatus set forth in claim 18 wherein said arm includes a base plate pivotally carried by the hub, an intermediate plate carried by the base plate for radial movement relative to the base plate, and a third plate carried by the intermediate plate for axial movement relative to the intermediate plate.

20.

The apparatus set forth in claim 19 wherein each of the base plate, intermediate plate and third plate includes at least one follower engageable with a cam surface of the cam system to control the movement of the base plate, intermediate plate and third plate relative to the hub.

21.

The apparatus set forth in claim 1 wherein said arm includes at least one tooling assembly including a stationary gripper carried by the arm and a movable carried gripper carried by the arm for movement relative to the stationary gripper, said movable gripper being operably connected to a cam follower that is responsive to the cam system to drive the movable gripper relative to the stationary gripper.

22.

The apparatus set forth in claim 21 wherein said arm includes two spaced apart tooling assemblies each including a movable gripper and a stationary gripper, each movable gripper being operably connected to the same cam follower for co-movement of the movable gripper of each tooling assembly.

23.

The apparatus set forth in claim 22 which also includes a lateral slide carried by the arm, said cam follower being carried by the lateral slide with each movable gripper operably connected to the lateral slide.

24.

The apparatus set forth in claim 23 which also includes a second cam follower carried by the lateral slide and responsive to the contour of an associated cam surface to move the lateral slide in a direction moving the movable grippers away from their associated stationary gripper.

25.

The apparatus set forth in claim 24 which also includes a plate carried by the arm for movement parallel to the second axis, said lateral slide being carried by said plate for movement in a direction perpendicular to said second axis and said second follower being moved along its associated cam surface when said plate is moved relative to the arm.

26.

The apparatus set forth in claim 25 which also includes at least one spring operably associated with said plate to yieldably bias the plate axially downwardly so that the plate moves downwardly under the combined forces of gravity and the spring.

27.

The apparatus set forth in claim 12 which also includes at least one spring operably associated with said plate to yieldably bias the plate axially downwardly so that the plate moves downwardly under the combined forces of gravity and the spring.

28.

The apparatus set forth in claim 19 which also includes at least one spring disposed between the intermediate plate and the third plate to yieldably bias the third plate axially downwardly so that the plate moves downwardly under the combined forces of gravity and the spring.

29.

The apparatus set forth in claim 12 which includes a latch selectively associated with said plate to maintain an axial position of the plate.

30.

The apparatus set forth in claim 19 which includes a latch selectively associated with said third plate to maintain an axial position of the third plate.

31.

The apparatus set forth in claim 30 wherein said latch is yieldably biased to an open position wherein the latch does not interfere with axial movement of the third plate, and is moved to a closed position to maintain the third plate in an axially raised position to prevent downward axial movement of the third plate until the latch is moved to its open position.

32.

The apparatus set forth in claim 31 which also includes a cam follower coupled to the latch to move the latch from its open position to its closed position.

33.

The apparatus set forth in claim 21 wherein at least one of the grippers includes an arcuate inner surface that defines a portion of a cavity in which a mold charge pellet is received.

34.

The apparatus set forth in claim 33 wherein the movable gripper includes an arcuate inner surface.

35.

The apparatus set forth in claim 21 wherein the movable gripper and the stationary gripper define a cavity in which a mold charge pellet is received and the movable gripper is movable relative to the stationary gripper from an open position wherein said cavity has its largest volume to a closed position wherein said cavity has its smallest volume, and in said closed position said grippers engage and retain a mold charge pellet in the cavity.

36.

The apparatus set forth in claim 35 which also includes a latch selectively associated with the movable gripper, the latch having an open position wherein it does not interfere with movement of the movable gripper and a closed position wherein the latch holds the movable gripper in its open position.

37.

The apparatus set forth in claim 36 which also includes a reject mechanism disposed adjacent to the path of movement of the arms as the hub rotates and operable to displace mold charge pellets from the grippers when it is desired to reject the mold charge pellets rather than deliver them to the mold cavities.

38.

The apparatus set forth in claim 37 wherein the reject mechanism includes a fluid nozzle that directs fluid under pressure onto the mold charge pellets to displace the mold charge pellets from the grippers.

39.

The apparatus set forth in claim 21 wherein each tooling assembly includes a knife disposed axially above the grippers.

40.

A method of delivering a mold charge pellet to a molding machine having a mold cavity, the method including the steps of:

providing a stream of molten plastic;

cutting said stream to form a pellet;

carrying said pellets away from said stream on an arm;

moving said arm about an axis toward the molding machine and aligning said pellet carried by said arm with said mold cavity by radially and angularly displacing said arm relative to said axis over a portion of the path of travel of the arm; and

moving at least a portion of said arm axially to discharge said pellet from said arm and into said mold cavity.

41.

1 The method of claim 40 wherein said step of moving said arm toward
2 the molding machine includes moving the arm so that a portion of said arm
3 travels in a plane.

42.

1 The method of claim 41 wherein said molding machine includes an
2 axis about which said mold cavity is rotated, said arm is rotated about a second
3 axis parallel to the axis of the molding machine and said plane is perpendicular
4 to a plane including the axis of the molding machine and the second axis.

43.

1 The method of claim 40 wherein two streams of molten plastic are
2 provided and both streams are cut to form two separate pellets by rotating said
3 arm through said streams.

44.

1 The method of claim 43 wherein said molding machine includes an
2 axis, said arm is rotated about a second axis parallel to the axis of the molding
3 machine and said plane is perpendicular to a plane including the axis of the
4 molding machine and the second axis.

45.

The method of claim 44 wherein said portion of said arm includes a point midway between said two pellets.

46.

The method of claim 45 wherein during said portion of said path of travel of the arm wherein said point travels along a plane, said arm is initially angularly positioned so that one end of the arm leads the other end of the arm relative to a radial line extending from the second axis to the arm, and during said portion of said path of travel the arm is angularly displaced so that said one end of the arm trails said other end of the arm relative to a radial line extending from the second axis to the arm.

47.

The method of claim 40 wherein said arm includes a base plate and a plate carried by and axially movable relative to the base plate, and said step of moving at least a portion of the arm axially includes moving said axially movable plate relative to the base plate.

48.

The method of claim 47 which also includes the step of providing a force yieldably biasing said axially movable plate to an axially lowered position, and said step of moving at least a portion of said arm axially is accomplished by moving the axially movable plate under said biasing force and the force of gravity.

49.

Apparatus for transferring a mold charge pellet to a molding machine having a mold with a mold cavity, including:

a hub rotated about an axis,

at least one arm extending generally radially from said hub to rotate with said hub around said axis, and

a cam system extending at least partially around said axis and operably coupled to said arm for moving said arm along a predetermined path with respect to said axis as said hub and said arm rotate around said axis, at least a portion of said arm traveling along a plane that is parallel to said axis during a portion of said path.

50.

The apparatus set forth in claim 49 wherein said cam system includes a cam arrangement for moving said arm radially inwardly and outwardly with respect to said axis as a function of rotation around said axis.

51.

The apparatus set forth in claim 49 wherein said cam system includes a cam arrangement for moving said arm angularly with respect to said hub as a function of rotation of said hub and said arm around said axis.

52.

The apparatus set forth in claim 49 wherein said cam system includes a cam arrangement for moving said arm axially parallel to said axis as a function of rotation around said axis.

53.

The apparatus set forth in claim 49 wherein said cam system includes a cam arrangement for moving said arm radially inwardly and outwardly with respect to said axis as a function of rotation around said axis, and for moving said arm angularly with respect to said hub as a function of rotation of said hub and said arm around said axis.

54.

The apparatus set forth in claim 49 wherein said cam system includes a cam arrangement for moving said arm radially inwardly and outwardly with

respect to said axis as a function of rotation around said axis and for moving said arm axially parallel to said axis as a function of rotation around said axis.

55.

The apparatus set forth in claim 49 wherein said cam system includes a cam arrangement for moving said arm angularly with respect to said hub as a function of rotation of said hub and said arm around said axis and for moving said arm axially parallel to said axis as a function of rotation around said axis.

56.

The apparatus set forth in claim 49 wherein said cam system includes a cam arrangement for moving said arm radially, axially and angularly with respect to said axis as a function of rotation around said axis.

57.

The apparatus set forth in claim 49 wherein said arm includes a pivot shaft carried by the hub and defining a pivot axis about which the arm is pivoted, said pivot axis being parallel to said axis.

58.

The apparatus set forth in claim 57 wherein the arm includes a base plate that is operably connected to the pivot shaft.

59.

The apparatus set forth in claim 58 wherein the arm includes a slide plate carried by the base plate for movement along the base plate generally radially with respect to said axis, said slide plate being responsive to the contour of a cam surface of the cam system to drive the slide plate relative to the base plate.

60.

The apparatus set forth in claim 58 wherein the arm includes a plate carried by the base plate for movement along the base plate generally axially with respect to said axis, said plate being responsive to the contour of a cam surface of the cam system to control movement of the plate relative to the base plate.

61.

The apparatus set forth in claim 58 wherein the arm includes an intermediate plate carried by the base plate for radial movement relative to the base plate and a third plate carried by the intermediate plate for movement with the intermediate plate relative to the base plate, and said third plate being movable relative to the intermediate plate in a direction parallel to the pivot axis.

62.

The apparatus set forth in claim 49 which also includes a pair of tooling assemblies carried by the arm and spaced from each other with each tooling assembly adapted to carry a separate mold charge pellet and wherein each mold includes at least a pair of radially aligned mold cavities, said arm being moved relative to said hub so that a point midway between the tooling assemblies moves in a plane during a portion of the hub rotation to facilitate aligning the mold charge pellets carried by the tooling assemblies.

63.

The apparatus set forth in claim 62 wherein the molding machine includes an axis parallel to said axis of the hub and about which said mold cavity is rotated, said plane being perpendicular to a plane that includes the axis of the hub and the axis of the molding machine.

64.

The apparatus set forth in claim 63 wherein during the portion of the hub rotation wherein said point midway between the tooling assemblies moves in said plane said point intersects said plane that includes the axis of the hub and the axis of the mold machine.

65.

The apparatus set forth in claim 62 wherein during said portion of hub rotation the arm is moved angularly and radially relative to the hub.

66.

The apparatus set forth in claim 65 wherein the arm is also moved axially relative to the hub to facilitate releasing the mold charge pellets from the tooling assemblies.

67.

The apparatus set forth in claim 66 wherein said arm includes a base plate pivotally carried by the hub, an intermediate plate carried by the base plate for radial movement relative to the base plate, and a third plate carried by the intermediate plate for axial movement relative to the intermediate plate.

68.

The apparatus set forth in claim 67 wherein each of the base plate, intermediate plate and third plate includes at least one follower engageable with a cam surface of the cam system to control the movement of the base plate, intermediate plate and third plate relative to the hub.

69.

The apparatus set forth in claim 49 wherein said arm includes at least one tooling assembly including a stationary gripper carried by the arm and a movable carried gripper carried by the arm for movement relative to the stationary gripper, said movable gripper being operably connected to a cam

follower that is responsive to the contour of a cam surface of the cam system to drive the movable gripper relative to the stationary gripper.

70.

The apparatus set forth in claim 69 wherein said arm includes two spaced apart tooling assemblies each including a movable gripper and a stationary gripper, each movable gripper being operably connected to the same cam follower for co-movement of the movable gripper of each tooling assembly.

71.

The apparatus set forth in claim 60 which also includes at least one spring operably associated with said plate to yieldably bias the plate axially downwardly so that the plate moves downwardly under the combined forces of gravity and the spring.

72.

The apparatus set forth in claim 67 which also includes at least one spring disposed between the intermediate plate and the third plate to yieldably bias the third plate axially downwardly so that the plate moves downwardly under the combined forces of gravity and the spring.

73.

1 The apparatus set forth in claim 67 which includes a latch selectively
2 associated with said third plate to maintain an axial position of the third plate.

74.

1 The apparatus set forth in claim 73 wherein said latch is yieldably
2 biased to an open position wherein the latch does not interfere with axial
3 movement of the third plate, and is moved to a closed position to maintain the
4 third plate in an axially raised position to prevent downward axial movement
5 of the third plate until the latch is moved to its open position.

75.

1 The apparatus set forth in claim 74 which also includes a cam follower
2 coupled to the latch to move the latch from its open position to its closed
3 position.

76.

A method of delivering a mold charge pellet to a molding machine having a mold cavity, the method including the steps of:

providing a stream of molten plastic;

cutting said stream to form a pellet;

carrying said pellet away from said stream on an arm;

moving said arm about an axis toward the molding machine and aligning said pellet carried by said arm with said mold cavity by radially and angularly displacing said arm relative to said axis over a portion of the path of travel of the arm.

77.

The method of claim 76 wherein during said portion of said path of travel of the arm, said arm is initially angularly positioned so that one end of the arm leads the other end of the arm relative to a radial line extending from said axis to the arm, and during said portion of said path of travel the arm is angularly displaced so that said one end of the arm trails said other end of the arm relative to a radial line extending from said axis to the arm.

78.

Apparatus for delivering mold charges, including:

a hub rotational around an axis,

at least one arm extending generally radially from said hub to rotate with said hub around said axis, and

a cam system extending at least partially around said axis and operatively associated with said arm for moving said arm in a predetermined direction with respect to said axis as said hub and said arm rotate around said axis.

79.

The apparatus of claim 78 wherein said cam system moves said arm radially relative to said axis.

80.

The apparatus of claim 78 wherein said cam system moves said arm angularly relative to said hub.

81.

The apparatus of claim 78 wherein said cam system moves said arm axially relative to said axis.

82.

The apparatus of claim 78 wherein said cam system moves said arm radially and axially relative to said axis.

83.

1 The apparatus of claim 78 wherein said cam system moves said arm
2 angularly relative to said hub and axially relative to said axis.

84.

1 The apparatus of claim 78 wherein said cam system moves said arm
2 radially relative to said axis and angularly relative to said hub.